



PCT/EP 03 / 04354



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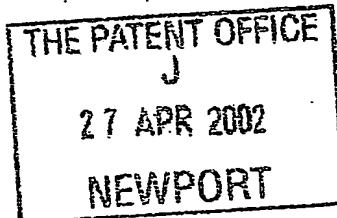
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SJW/8369

2. Patent application number
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3. Full name, address and postcode of the or of each applicant (underline all surnames)

Cerestar Holding B.V.
Nijverheidsstraat 1
P.O. Box 9
4551 LA Sas van Gent
Holland

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

Dutch 700624000?

4. Title of the invention

Sugar-free hard coatings prepared from liquid maltitol

5. Name of your agent (if you have one)

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

Stevens Hewlett & Perkins
1 St. Augustine's Place
Bristol BS1 4UD
United Kingdom

Patents ADP number (if you know it)

1545002

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number
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Date of filing
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7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing
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8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

Yes

- a) any applicant named in part 3 is not an inventor, or
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Patents Form 1/77

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Continuation sheets of this form -

Description 7

Claim(s) 2

Abstract 1

Drawing(s) 2

10. If you are also filing any of the following, state how many against each item.

Priority documents -

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Statement of inventorship and right to grant of a patent (*Patents Form 7/77*) -

Request for preliminary examination and search (*Patents Form 9/77*) -

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11. I/We request the grant of a patent on the basis of this application.

Signature S. J. Wilkinson Date 26/04/02
STEVENS HEWLETT & PERKINS

12. Name and daytime telephone number of person to contact in the United Kingdom S.J. Wilkinson 0117 9226007

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Sugar-free hard coatings prepared from liquid maltitol

Technical field

The present invention relates to a sugar-free hard coating prepared from a liquid coating syrup of maltitol comprising from 95 and 97% maltitol by weight of the dry matter content. The present invention relates to sugar-free hard-coated comestibles having regular surfaces and non-sticky hard coating.

Background of the invention

Conventional panning procedures to prepare hard coatings generally work with sucrose, but recent advances in panning have allowed the use of other carbohydrate materials to be used in the place of sucrose. Sucrose proves to be detrimental for teeth and causes dental caries due to easy formation of acids. Therefore coatings are nowadays increasingly made of sugar-free compositions.

The appearance of the coating is sometimes affected by the crystallisation difficulties. To obtain good hard coatings, even crystallisation must occur during application and drying.

EP 0 201 142 describes a confectionery or pharmaceutical product provided with a hard sugarless coating obtained by hard coating using a maltitol syrup having a dry matter content from 50 to 70% by weight, the said coating being essentially crystalline and comprising at least 90% by weight of maltitol.

Summary of the invention

The present invention relates to sugar-free hard-coated comestibles consisting of a hard coating and an edible, chewable and/or pharmaceutical core and said hard coating is obtainable by using a coating syrup containing a maltitol syrup having a dry matter content from 68-72% by weight and said maltitol syrup is comprising at least 95% maltitol, characterised in that dry matter of said maltitol syrup is consisting of

- a) From 95-97% by weight of maltitol,
- b) Maximum 1.5% by weight of DP₁,

- a) From 0 – 1.5% by weight of DP₃, and
- c) From 0.7-1.5% by weight of DP₄₊.

The current invention relates to sugar-free hard-coated comestibles wherein the hard coating is further comprising anti-sticking components, binding agents, dispersing agents, film formers, colouring agents, and/or flavouring agents.

The current invention relates to sugar-free hard-coated comestibles wherein the hard coating consists of from 1 to 100 layers.

The current invention further relates to sugar-free hard-coated comestibles wherein the core is selected from the group consisting of pharmaceutical tablets, chewing gum, confectionery product, chocolate and nut.

The current invention describes a sugar-free hard-coated comestible wherein the core is chewing gum and the hard coating is non-sticky and the surface of the hard coating is regularly formed and remains intact during processing.

The current invention relates to a process for preparing sugar-free hard-coated comestibles wherein the hard coating is obtainable from a liquid maltitol syrup and said process is comprising the following steps:

- a) Applying the maltitol syrup onto the cores of the comestibles in a moving bed of a coating apparatus,
- b) Applying maltitol in powder form,
- c) Drying the coated cores by using drying air and drying air is in the temperature range of from about 15 to 45°C and a moisture content of at most 50% relative humidity is applied, and the process is characterised in that the maltitol syrup has a dry matter content from 68-72% by weight, and said dry matter is consisting of
 - i) From 95-97% by weight of maltitol,
 - ii) Maximum 1.5% by weight of DP₁,
 - iii) From 0 – 1.5% by weight of DP₃,
 - iv) From 0.7-1.5% by weight of DP₄₊.

Furthermore, the current invention relates to the use of maltitol syrup as crystalline coating of sugar-free hard-coated comestibles characterised in that the syrup has a dry matter content from 68-72% by weight, and said dry matter is consisting of

- a) From 95-97% by weight of maltitol,
- b) Maximum 1.5% by weight of DP₁,
- b) From 0 – 1.5% by weight of DP₃, and
- c) From 0.7-1.5% by weight of DP₄₊.

Brief description of the drawings

Figure 1 is a photograph, with magnification of 6x10.

It shows that the hard coating prepared with the liquid maltitol syrup of 96% maltitol and 0.7-1.5% by weight of DP₄₊ based on dry matter, is giving a smooth regular surface.

Figure 2 is a photograph, with magnification of 6x10.

It shows that the hard coating prepared with the liquid maltitol syrup of 91% maltitol based on dry matter content, is giving an irregular surface.

Detailed description of the invention

The present invention relates to sugar-free hard-coated comestibles consisting of a hard coating and an edible, chewable and/or pharmaceutical core and said hard coating is obtainable by using a coating syrup containing a maltitol syrup having a dry matter content from 68-72% by weight and said maltitol syrup is comprising at least 95% maltitol, characterised in that dry matter of said maltitol syrup is consisting of

- a) From 95-97% by weight of maltitol,
- b) Maximum 1.5% by weight of DP₁,
- c) From 0 – 1.5% by weight of DP₃, and
- d) From 0.7-1.5% by weight of DP₄₊.

The maltitol syrup can be obtained by hydrogenating maltose syrups which contain at least 96% maltose based on dry matter content.

EP 0.201.412 describes a hard coating by applying a maltitol syrup which is containing at least 90% maltitol based on dry matter content. In fact, a maltitol syrup consisting of 97.1% by weight of maltitol, 1.1% by weight of sorbitol and 1.8% by weight of maltotriitol is disclosed. Furthermore, it is clearly demonstrated that by applying this syrup at a dry substance content beyond 65%, the crystallisation is irregular and surface defects appear.

Surprisingly, the current invention demonstrates that maltitol syrups containing 95-97% maltitol on dry matter content and from 0.7-1.5% DP₄₊ on dry matter content, are suitable for obtaining regular hard coatings when applied at a dry substance of 68-72% (see Figure 1). Preferably, maltitol syrups having a dry matter content from 70-72%, result in a hard coating with a homogeneous surface.

The hard coatings can be prepared according to a process which is described for sorbitol coating in WO 91/09989, and said hard coating process comprises the following steps:

- a) Applying a maltitol syrup onto the cores of the comestibles in a moving bed of a coating apparatus,
- b) Applying maltitol in powder form,
- c) Drying the coated cores by using drying air.

The drying air is in the temperature range of from about 15 to 45°C and a moisture content of at most 50% relative humidity is applied.

The process is characterised in that the maltitol syrup has a dry matter content from 68-72% by weight, and said dry matter is consisting of

- i) From 95-97% by weight of maltitol,
- ii) Maximum 1.5% by weight of DP₁,
- iii) From 0 – 1.5% by weight of DP₃,
- iv) From 0.7-1.5% by weight of DP₄₊.

The current invention relates to sugar-free hard-coated comestibles wherein the hard coating is further comprising anti-sticking components, binding agents, dispersing agents, film formers, colouring agents, and/or flavouring agents.

~~The hard coating can be prepared by applying a coating syrup which is containing~~
besides the maltitol syrup additives, such as anti-sticking components, binding agents, dispersing agents, film formers, colourings agents and/or flavouring agents. In fact, any colouring agent which is approved for use in foodstuffs may be used. Furthermore, flavouring agents in liquid or solid form of both natural and synthetic origin can be used.

The current invention relates to sugar-free hard-coated comestibles wherein the hard coating consists of from 1 to 100 layers.

In general a plurality of layers is obtained by applying single coats allowing the layers to dry, and then repeating the process. Any number of the coats may be applied to the core. Coatings of from 1 to 100 layers are easily obtained, preferably the number of layers is between 1 and 40. The optimal amount of layers will depend on the desired application and can be determined experimentally.

The current invention further relates to sugar-free hard-coated comestibles wherein the core is selected from the group consisting of pharmaceutical tablets, chewing gum, confectionery product, chocolate and nut.

Especially a sugar-free hard-coated comestible wherein the core is chewing gum and the hard coating is non-sticky and the surface of the hard coating is regularly formed and remains intact during processing and during any post-treatment (such as packaging) is disclosed by the current invention. A coating syrup prepared from a maltitol syrup which is comprising 99 – 100% by weight of maltitol, gives a coating which is brittle and results in breakage and causes problems after processing, such as during packaging, etc.

The effectiveness of the current invention is demonstrated by the hard coating of a chewing gum (example 1- figure 1). To demonstrate the regular surface of the hard coating, said hard coating is compared with a hard coating prepared with a maltitol syrup which is containing on dry matter 91% maltitol. (see figure 2).

Furthermore, the current invention relates to the use of maltitol syrup as crystalline coating of sugar-free hard-coated comestibles characterised in that the syrup has a dry matter content from 68-72% by weight, and said dry matter is consisting of

- a) From 95-97% by weight of maltitol,
- b) Maximum 1.5% by weight of DP₁,
- c) From 0 – 1.5% by weight of DP₃,

d). From 0.7-1.5% by-weight of DP₄₊.

The use of said maltitol syrup results in a regular surface of hard coating.

In particular the content of DP₄₊ in the liquid maltitol syrup, makes the current syrup suitable for hard coating process and for obtaining a regular surface.

The current invention has the following advantages:

- the liquid maltitol syrup can be applied at high dry matter content and yet regular surfaces of hard coating can be obtained,
- the coating remains intact during processing and during handling afterwards, such as during packaging etc,
- the process for hard coating does not need evaporation of the excess of water, since the liquid maltitol syrup is available at high dry substance, and this is resulting in a more economical process.

The present invention is illustrated by way of the following example.

Example 1

The coating was performed in a 2 kg coating pan.

1.5kg cores, wherein the weight of uncoated centres was 0.9 g each, were rotating at 8 rpm. 5ml coating syrup (liquid maltitol syrup consisting of 96% maltitol, 1.4% DP1, 1.4% DP3, and 0.9% DP4+ based on dry matter content and having a dry matter content of 70.3%) (C☆Maltidex 163K9) was spread over the centres. Dry maltitol powder was added to avoid stickiness and to start the crystallisation. The drying step was carried out by blowing air into the coating pan at 24°C. The coating was built up by repetitively applying this process. The amount of syrup added increased up to 30ml/layer.

The coated chewing gum is shown in Figure 1, wherein it is clearly demonstrated that the hard coating has a regular, homogeneous surface.

The hard coating remains intact during processing and during handling (packaging) afterwards.

Comparative example

Example 1 was repeated by applying a coating syrup comprising 91.2% maltitol, 1.7% DP1, 4.7% DP3, and 2.5% DP4+ based on dry matter content and having a dry matter content of 72.0%.

Figure 2 corresponds to the hard coating prepared according to this example. The hard coating is irregular. This is completely different from the hard coating prepared according to example 1 and displayed in figure 1.

Claims

1. Sugar-free hard-coated comestibles consisting of a hard coating and an edible, chewable and/or pharmaceutical core and said hard coating is obtainable by using a coating syrup containing a maltitol syrup having a dry matter content from 68-72% by weight and said maltitol syrup is comprising at least 95% maltitol, characterised in that dry matter of said maltitol syrup is consisting of
 - a) From 95-97% by weight of maltitol,
 - b) Maximum 1.5% by weight of DP1,
 - c) From 0 – 1.5% by weight of DP3,
 - d) From 0.7-1.5% by weight of DP₄₊.
2. Sugar-free hard-coated comestibles according to claim 1 characterised in that the hard coating comprises anti-sticking components, binding agents, dispersing agents, film formers, colouring agents, and/or flavouring agents.
3. Sugar-free hard-coated comestibles according to claim 1 or 2 wherein the hard coating consists of from 1 to 100 layers.
4. Sugar-free hard-coated comestibles according to claim 1 wherein the core is selected from the group consisting of pharmaceutical tablets, chewing gum, confectionery product, chocolate and nut.
5. Sugar-free hard-coated comestibles according to claim 4 characterised in that the core is chewing gum and the hard coating is non-sticky and the surface of the hard coating is regularly formed and remains intact during processing.
6. Process for preparing sugar-free hard-coated comestibles wherein the hard coating is obtainable from a liquid maltitol syrup and said process is comprising the following steps:

- a) Applying the maltitol syrup onto the cores of the comestibles in a moving bed of a coating apparatus,
 - b) Applying maltitol in powder form,
 - c) Drying the coated cores by using drying air and drying air is in the temperature range of from about 15 to 45°C and a moisture content of at most 50% relative humidity is applied, and the process is characterised in that the maltitol syrup has a dry matter content from 68-72% by weight, and said dry matter is consisting of
 - i) From 95-97% by weight of maltitol,
 - ii) Maximum 1.5% by weight of DP1,
 - iii) From 0 – 1.5% by weight of DP3,
 - iv) From 0.7-1.5% by weight of DP₄₊.
7. Use of maltitol syrup as crystalline coating of sugar-free hard-coated comestibles characterised in that the syrup has a dry matter content from 68-72% by weight, and said dry matter is consisting of
- a) From 95-97% by weight of maltitol,
 - b) Maximum 1.5% by weight of DP1,
 - c) From 0 – 1.5% by weight of DP3,
 - d) From 0.7-1.5% by weight of DP₄₊.

Abstract

The present invention discloses a sugar-free hard coating prepared from a liquid maltitol syrup. Coating with liquid maltitol gives a crunchy hard coating, which is not cracking during post-processing. The invention also relates to products coated with said liquid maltitol syrup comprising 95-97% maltitol on dry matter content.

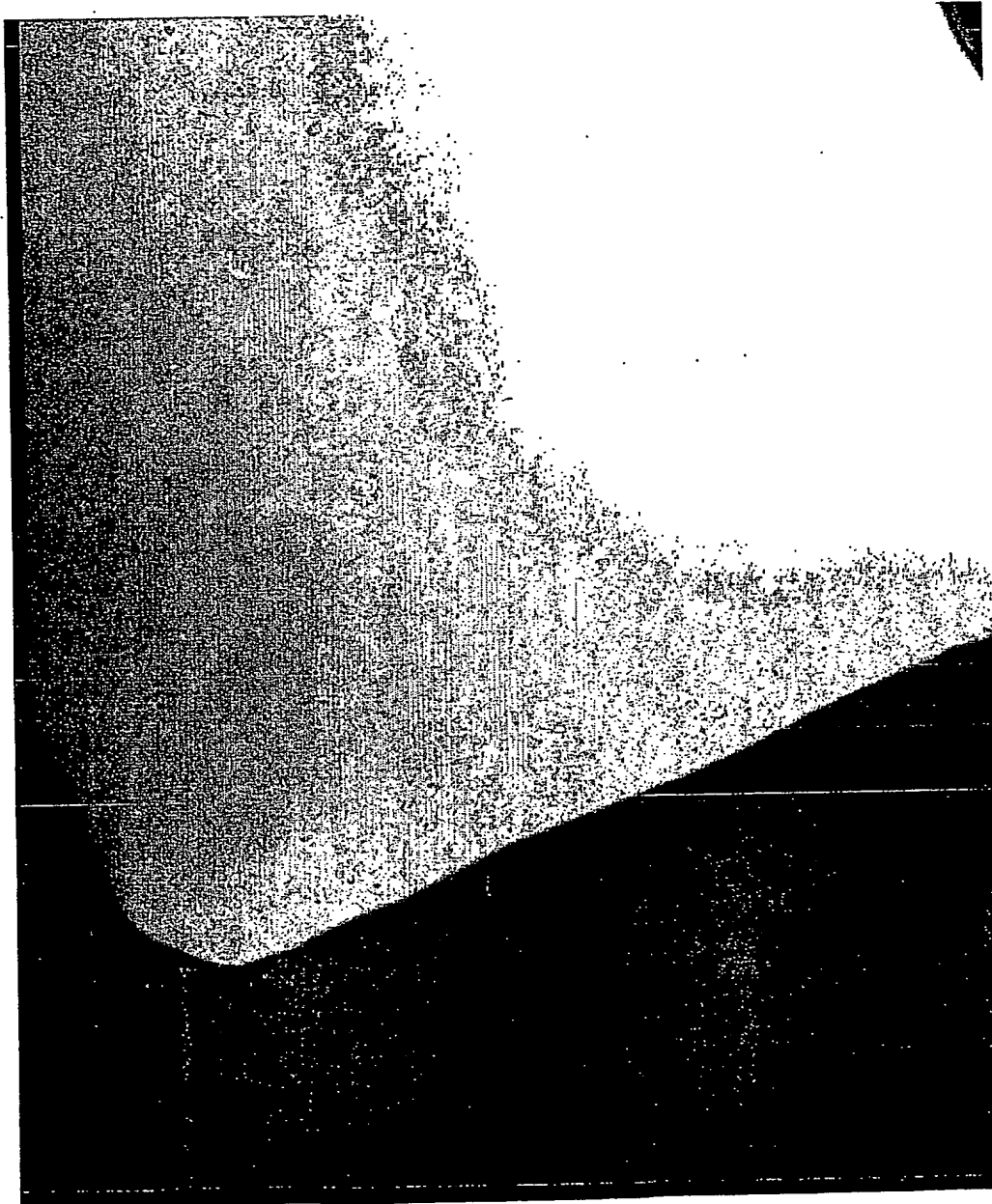


Figure 1

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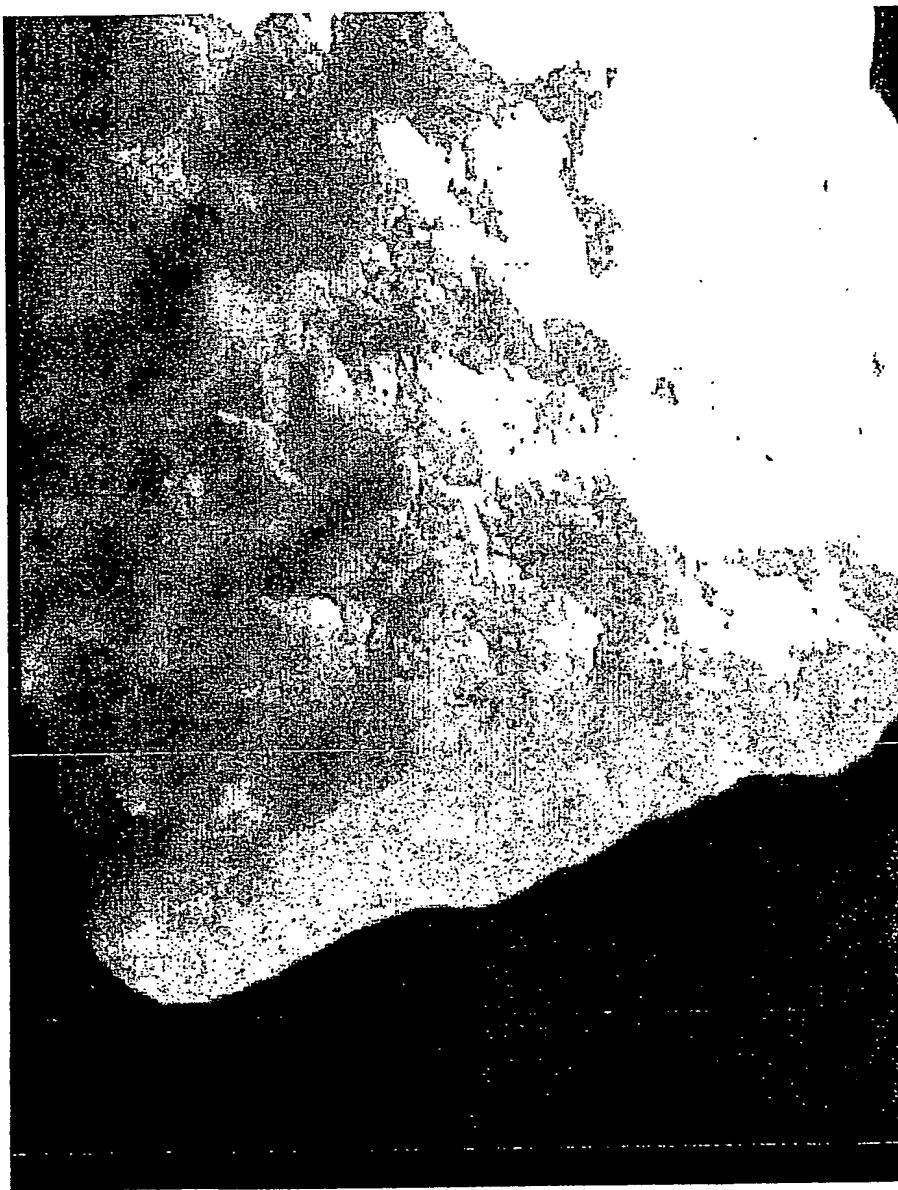


Figure 2

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